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Lower pipe temperature possible thanks to cavity screen

HVS experiences a more stable climate and lower pipe temperature thanks to cavity screen

HVS Orchids from Pijnacker specializes in the selection, propagation, and cultivation of cut cymbidium orchids. In their search for energy savings, they turned to a cavity screen. A single installation, yet a double screen. As a result, they not only saw their energy consumption decrease, but stem breakage has also become a thing of the past.

On an area of 35,000 m², spread over two locations, Ben van Schie, together with his father Harry and brother Sjaak, grows more than one hundred different varieties of cut cymbidium. New varieties are added each year from their own breeding program. HVS Orchids supplies cut cymbidiums almost year-round. Only in August, when many of their customers are on holiday, production temporarily stops. The company originated in Pijnacker, where Van Schie's father started the business in 1990. The greenhouse at this location has expanded over the years from 8,000 to 14,000 m².

“In this greenhouse, we didn't have the option to install an additional screen system,” says Van Schie. “We looked for ways to still save energy and heard through Doek en Draad, supplier of screen fabrics and installations, about the existence of a cavity screen. That turned out to be a good solution.”

No stem breakage

Ron Groenewald, responsible for sales at Doek en Draad, explains how they came up with the idea of a cavity screen. “With the current challenges in horticulture, we also asked ourselves how we could contribute to energy savings. In construction, cavity walls have become indispensable. We translated that principle into a screen installation.”

Initially, a six-centimeter intermediate layer was used, which still allowed some air circulation. In current cavity screens, the distance between the two layers has been reduced to four centimeters, resulting in a more stable climate beneath the screen. Van Schie noticed changes in the climate immediately after installation in 2024.

“We not only saw our energy consumption decrease, but also saw some persistent problems in cymbidium cultivation almost disappear. In the first year after installing the cavity screen, we hardly experienced any stem breakage. This is a phenomenon that often occurs in cymbidiums during the night when the stems stretch. It was remarkable that under the cavity screen, with higher humidity, we were still able to grow a good product.”

Monitoring two sections

Cavity screens are available with various screen values. For the greenhouse in Pijnacker, a relatively transparent screen was chosen, while in Nootdorp a slightly darker version was selected. There is also a choice between clear and diffuse materials. The results in Pijnacker were satisfactory. By now, around 90 hectares in the Netherlands have been equipped with cavity screens. There is no doubt about their effect.

However, both the grower and the installer still had questions regarding the substantiation of the results. “In cucumber cultivation, savings of 30–35% on gas are known,” says Groenewald. “But until now, we couldn’t substantiate those results with measurement data.” Positive results alone were not enough for both Van Schie and Doek en Draad. This led to the idea of conducting a trial at HVS Orchids’ second location in Nootdorp.

This location, covering 23,000 m², is divided into sections of 4,000 m². “We selected two sections to monitor: one equipped with a cavity screen and the other with a single energy screen,” Van Schie explains. They then engaged Sigrow, a company that provides sensors and helps growers optimize greenhouse climates.

Less radiation loss

Gijs van Asselt from Sigrow supports Van Schie in monitoring the data. His explanation for the absence of stem breakage and the ability to grow under more humid nighttime conditions is that plant temperature remains higher during the night.

“As a result, the crop experiences less radiation loss and can convert more sugars.”

This is supported by measurements. With twelve microsensors—six per section—temperature and relative humidity were mapped.

“We already experienced a more uniform climate under the cavity screen,” says Van Schie. “Now the measurements confirmed it.”

Van Asselt adds that significantly less radiation loss is recorded in the section with the cavity screen. “Using a radiation sensor, we monitor crop radiation loss. Based on that, we can optimize screen and vent positions to reduce energy loss. We also use a thermal camera system to measure plant temperature and activity.”

Cooler in summer

“We see that plant activity in both sections is almost the same,” says Van Schie. “The difference is that the section without a cavity screen uses more energy. We’ve seen days with forty percent less energy consumption compared to previous years.”

Data over the full season still needs to be analyzed to determine the average savings. Previously, they worked with a top heating pipe at 40°C and a bottom pipe at 30°C. With a cavity screen, they use a top pipe of 35–40°C and no bottom pipe at all.

“This brings more stability to cultivation. We also see that more humidity is retained under the cavity screen without condensation forming on it. Insulation works both ways—it also keeps heat out in summer. In winter, the temperature difference above and below the screen is greater, allowing us to remove moisture from the greenhouse with a smaller opening.”

Another option for moisture removal is using a dehumidifier. “We use those in other sections, but not yet under the cavity screen, so we cannot comment on its effect there.”

A cavity screen does require a higher investment—about thirty percent more than a standard screen. “However, you only need one installation. That can save costs if you’re choosing between a single or double system, or if there’s no possibility for a second installation.”

SUMMARY

Installing a cavity screen is one way to save energy. Over the past four years, 90 hectares of cavity screens have been installed. Energy savings are evident, but until now lacked solid substantiation. A collaboration between cymbidium grower HVS Orchids, screen installer Doek en Draad, and climate optimization specialist Sigrow provides insight into greenhouse climate, energy loss, moisture balance, and plant temperature. A cavity screen creates a more stable climate and can achieve energy savings of up to thirty percent.